

# Matrix 12800 Series

Fully Configurable Matrix Switchers with IP Link® from 32x16 to 128x128



## COMMON FEATURES

- **Inputs:** Video on female BNC connectors; audio on captive screw connectors
- **Outputs:** Video on female BNC connectors; audio on captive screw connectors
- **375 MHz (-3 dB) RGB video bandwidth, fully loaded** (wideband models) — Ensures switching and distribution of signals without signal degradation. The 375 MHz (-3dB) rating is a worst case specification, i.e., the Matrix 12800 provides 375 MHz (-3dB) at full performance capacity when one input signal drives all outputs.
- **150 MHz (-3 dB) video bandwidth, fully loaded** (low resolution models) — For lower resolution video signals where high bandwidth is not required, such as composite video, S-video, and component video systems.
- **Compatible with composite video, S-video, component video, HDTV, RGsB, RGBS, RGBHV, and/or balanced/unbalanced mono or stereo audio**
- **Field-upgradeable and hot swappable, modular design** — The Matrix 12800 provides the highest level of flexibility, expandability, and affordability by allowing users to purchase only the modules required for their systems. Additional input and output cards may be added at any time through the front panel for easy and quick upgradeability or expansion. Hot swappable components allow the user to replace any part at any time—no need to power down the switcher. This is especially useful for crucial applications that require continuous operation of the Matrix 12800.
- **Advanced computer-aided diagnostics** — Provides 24-hour self-diagnostics of input/output boards, primary and redundant power supply voltages, controllers, cooling status, and overall functional status of the matrix. Using a RS-232 or RS-422 communications port, status monitoring is possible for off-site or unmanned locations, such as telco, government, military, or any other sensitive, 24 hours a day, 7 days a week environments.
- **Triple-Action Switching™ for RGB Delay** — The Matrix 12800 is capable of programmable RGB delay on every output. RGB delay blanks the screen when the matrix switcher switches to a new source. The new sync signals precede the RGB signals, so there is no glitch shown during the transition. The time delay between the RGB and sync signals is user adjustable up to five seconds.
- **Easy maintenance and serviceability for low meantime to repair** — With the front panel allowing full accessibility to the internal workings and modular assemblies, the basic architecture of the matrix allows for easy maintenance and serviceability, as well as low mean-time to repair.
- **Dual, fully redundant, and hot swappable power supplies and cooling fans** — Primary and back-up controllers, power supplies, and cooling fans provide added reliability for critical applications. The optional redundant controller provides mirrored memory, CPU and auto-failover capabilities, and a secondary RS-232 port, enabling a redundant third party control system to communicate with the matrix system. It also provides an increased level of reliability by adding an additional controller that assumes management of the matrix system if a primary controller failure should occur.
- **DSVP™ - Digital Sync Validation Processing** — Extron's exclusive DSVP verifies active sources by scanning all inputs for active sync signals. DSVP then transmits the horizontal and vertical scan rate information to the user via any type of control system using RS-232 and RS-422 commands.
- **Excellent channel-to-channel isolation** — The Matrix 12800 provides excellent isolation between channels and extremely low electromagnetic emissions perfect for minimizing signal leakage in high security or government environments.
- **Rooming and presets** — The Matrix 12800 can be configured for several different applications without the need to change the settings each time the application changes.
- **Video interval switching** — Enables smooth, seamless transitions when switching between inputs.
- **Two AC power inputs** — For added power reliability, some 24-hour environments offer two separate AC power sources, one as the primary source and the second as a redundant one. The Matrix 12800 offers two AC power inputs for continuous connection to both power sources.
- **RS-232 and RS-422 serial control port** — Using serial commands, the Matrix 12800 Series can be controlled and configured via the included Windows-based control software, or integrated into third-party control systems. Extron products use the SIS™ - Simple Instruction Set command protocol, a set of basic ASCII code commands that allow for quick and easy programming.
- **Extron virtualization/control software** — For RS-232 and RS-422 remote control from a PC, Extron ships our Windows®-based control software with every matrix switcher. This icon-driven software uses a graphical, drag-and-drop interface to make I/O configuration and other customization functions simple and convenient. This software also offers an emulation mode for configuration of an offsite matrix switcher; the I/O configuration may then be saved for future downloading to the matrix switcher.
- **Optional FPC 5000 LCD Front Panel Controller**
- **Optional control panels and keypads** — Provide the flexibility to control a Matrix 12800 Series matrix switcher from a remote location.
- **Balanced or unbalanced audio** — The Matrix 12800 switches both balanced or unbalanced mono or stereo audio signals. Depending on the application and cable distance requirements, some systems will require balanced audio.



Optional MKP 3000  
X-Y Control Panel

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## Matrix 12800 Series

### COMMON FEATURES (CONTINUED)

- **Audio input gain and attenuation** — The Matrix 12800 allows users to set the gain/attenuation level from the front panel or RS-232 and RS-422. Individual input audio levels may be adjusted so there are no noticeable volume differences between sources.
- **Audio breakaway** — With breakaway switching, the Matrix 12800 can separate the audio signal from the video signal to switch either video only or audio only. The breakaway feature allows audio follow on any one or all channels, or the audio inputs and outputs can be operated as a separate audio matrix.
- **Trouble status indication** — The SmartControl microprocessor within the CPU of the Matrix 12800 acts as a status indicator at all times.
- **Front panel security lockout** — If a Matrix 12800 is installed in an unsecured environment, an optional password feature can be implemented. When this feature is in use, a password is required to operate the front panel controller.
- **IP Link® Ethernet control and monitoring** — An exclusive technology developed by Extron specifically engineered to meet the needs of professional A/V environments, which enables the Matrix 12800 to be controlled and proactively monitored over a LAN, WAN, or the Internet. An intuitive Web interface is also included for such common functions as I/O switching, system control, and online diagnostics and monitoring.
- **Rack-mountable enclosure**
- **Internal international power supply** — The 100-240VAC, 50/60 Hz, universal power supply provides worldwide power compatibility.

### DESCRIPTION

The Extron **Matrix 12800 Series** Matrix Switchers are the solution for very large-scale routing applications that require up to 128 inputs and 128 outputs. A matrix switcher is the most important asset in a centralized A/V switching environment. The cost-effective Matrix 12800 provides the performance, reliability, expandability, redundancy, and serviceability crucial to any mission-critical environment. With convenient control via the FPC 5000 front panel controller, MKP 1200 remote keypad, MCP 1000 Master Control Panel, or RS-232 and RS-422 control, the Matrix 12800 will fit within any system design. The Matrix 12800 wideband provides modular switching of RGBHV, RGBS, RsGsBs, RGsB, component video, S-video, composite video, and/or two channel stereo audio. With video bandwidth of 150 MHz or 375 MHz (-3dB) when fully loaded, the Matrix 12800 maintains the integrity of any routed signal.

The Matrix 12800 Series includes video, wideband, sync, and audio models. A minimum 32x16 configuration is provided for lowband, wideband, and sync frames, and a minimum 16x16 configuration is provided for audio. Each model includes the flexibility to upgrade to 128x128. Internal cards are hot swappable, so there is no need to power down the matrix switcher during field upgrades or expansion. A full complement of BNC connectors on the rear panel and modular internal card slots are ready to be filled as needed, ensuring that the Matrix 12800 matrix switchers can grow to accommodate any system — even systems that are still expanding. From the start, Extron offers service and support for the planning, installation, maintenance, as well as expansion of any Matrix 12800 system.

#### Self-monitoring

The Matrix 12800 is an excellent choice for off-site or unmanned A/V systems, especially sensitive, 24 hours a day, 7 days a week environments. The self-monitoring features, redundant power, and cooling systems make the Matrix 12800 a uniquely reliable matrix switcher ideal for mission-critical applications, such as telco, government, or military installations. Advanced computer aided diagnostics provides 24-hour self-diagnostics of I/O boards, power supplies, controllers, cooling fans, and general functions of the switcher. Extron's exclusive DSVP™ - Digital Sync Validation Processing verifies active sources by scanning all inputs for active sync signals. DSVP then transmits the horizontal and vertical scan rate information to the user via any type of control system using RS-232 and RS-422 commands. A user may monitor the status of the Matrix 12800's sources, functions, and internal components remotely using RS-232 and RS-422 or IP Link® Ethernet communications.

#### Hot Swappable and Redundant Options

For mission-critical applications, the Matrix 12800 offers the convenience of hot swappable I/O boards, power supplies, controllers, and cooling fans. Hot swappable components allow the user to replace any part at any time without having to power down the matrix. This is especially useful for crucial applications that require continuous operation of the Matrix 12800. The user may expand the switcher or swap out components without disrupting the switcher's functions.

The primary and backup power supplies handle both positive and negative DC voltages and are internally mounted within the switcher. The primary power supply system is configured to support automatic fail-over to a hot spare power supply. This means zero downtime for the system and no loss of functionality should a power supply fail. This feature is necessary when power reliability is crucial. Both primary and redundant controllers monitor the matrix system. If the primary controller should fail, the redundant controller assumes management of the matrix system, providing added dependability. Also, installation and service are easy because there is no need for tools to remove each power supply and each is accessible through the front of the matrix switcher.

Four cooling fans are provided for ventilation and heat management. Sensors notify the user of any failures — through visual cues, audio cues, or RS-232 and RS-422 communications. Fans and filters are easily accessible through the front panel for maintenance and replacement.



Matrix 12800 interior

#### Rooming Presets and Virtualization

Using a feature called "rooming," each Matrix 12800 can be programmed to assign multiple outputs to specific "rooms," allowing them to have their own grouped presets. Room presets offer unrivaled flexibility and convenience, particularly in systems that require switching between several locations. Once a room has been configured and stored, it is switched independently of other rooms so that signals sent to one room will never "walk" in on another room.

Rooming is made possible by user-defined virtual maps, which ascribe "locality" to the physical inputs and outputs of the Matrix 12800. Virtual mapping makes it possible to configure the switchers in unique ways, dictated by each virtual input/output i.e., the assignment of each individual connector, and each group of connectors, called a virtual plane. Extron virtualization/control software makes these configurations possible. The software easily translates the appropriate virtual map into the switcher's memory with minimal effort on the part of the installer.

Matrix 12800 matrix switchers offer global presets that can be set to define configurations of specific inputs to any specific combination of outputs or to all outputs. Rooming presets and global presets can be programmed and recalled at the front panel or by remote control.

These features are rounded out by advanced computer aided diagnostics, redundant power supplies, redundant cooling fans, DSVP, Triple-Action Switching™, and a rack-mountable enclosure. The convenient features and the hot swappable, modular design make the Matrix 12800 the best choice for very large-scale routing applications.

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## Matrix 12800 Series

### DESCRIPTION (CONTINUED)

#### FPC 5000

The FPC 5000 Front Panel Controller is an intuitive, 12.1 inch touch-screen, control interface designed exclusively for the Matrix 12800. The easy-to-use FPC 5000 can control, monitor, access, and manage all of the Matrix 12800 matrix switcher set-up and control functions via an intuitive, menu-driven interface. Any user, regardless of their technical proficiency, can easily navigate through its simple and straightforward menus to change, monitor, or control the features of the Matrix 12800. With IP Link Ethernet capabilities, it can access the matrix from anywhere on a network, from multiple sites, as well as via the Internet. Housed within a 7U panel, the FPC 5000 can be installed in a rack, podium, or control console.



FPC 5000

#### IP Link® Ethernet Control

The Matrix 12800 Series is equipped with Extron's IP Link, an IP integration technology specifically engineered to meet the needs of professional A/V environments — from K-12 classrooms to large universities, businesses, and residential media systems.

IP Link is built around an integrated, high performance Web server that features global compatibility with industry standard Ethernet communication protocols, multi-user support, and GlobalViewer™ software. GlobalViewer, a Web-based application, enables a variety of asset management functions including proactive maintenance and remote technical support from any administrator authorized LAN, WAN, or Internet client.

On the Matrix 12800 Series, IP Link provides technical support personnel with the ability to receive service and failure messages through an e-mail-enabled cell phone, PDA, pager, or e-mail account. Utilizing IP Link, the help desk can also view embedded Web pages to manage, monitor, and troubleshoot the switcher for the following:

#### Asset Management

- Remotely select input and output ties for audio only, video only, or audio and video
- Name and select global I/O presets
- Set audio input and output volume levels
- Set RGB delay time for glitch-free transitions
- Upload firmware updates via the Internet

#### Operating Status and Diagnostics

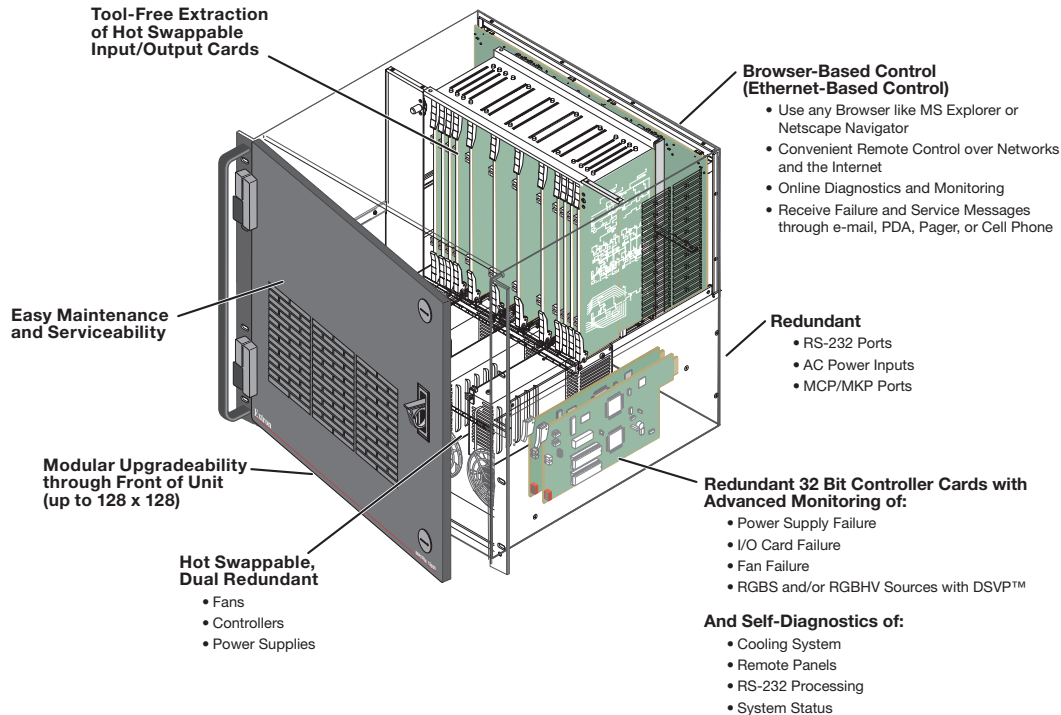
- Monitor primary and redundant power supply voltages
- Monitor operating temperature
- Recall firmware revision and other data for improved Help Desk support
- Provides immediate notification via e-mail for loss of input signal, power supply failure, and other critical service information
- Upload firmware updates

#### DSVP

- Verify active sources by polling inputs for horizontal and vertical sync rate information

#### SIS™ - Simple Instruction Set Control

SIS simplifies RS-232 by utilizing a limited set of commands that are easy to remember and use. Three factors that make SIS superior for RS-232 remote control are that characters can be generated directly from the keyboard, the same instruction works with many Extron products, and it provides informative responses to each command sent.



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Matrix 12800 Series

Matrix 12800

Fully Configurable Matrix Switchers with IP Link® From 32x16 to 128x128



Matrix 12800 Wideband



Matrix 12800 Audio



MODEL	VERSION DESCRIPTION	PART #
Matrix 12800 Video	Low Resolution Models .....	call
Matrix 12800 Wideband	Wideband Models .....	call
Matrix 12800 Sync	Sync Models .....	call
Matrix 12800 Audio	Mono and Stereo Audio Models .....	call

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## Matrix 12800 Series

## SPECIFICATIONS

## VIDEO – WIDEBAND / VIDEO BMES

<b>Routing</b> .....	32 x 16 or larger matrix up to 128 x 128, depending on the configuration
<b>Gain</b> .....	Unity
<b>Bandwidth</b> .....	
Wideband models .....	375 MHz (-3 dB), fully loaded 0 MHz to 10 MHz: no more than +0.1 dB to -0.1 dB 0 MHz to 130 MHz: no more than +4 dB to -0.25 dB
Video models .....	150 MHz (-3 dB), fully loaded 0 MHz to 10 MHz: no more than +0.1 dB to -0.1 dB 0 MHz to 30 MHz: no more than +0.5 dB to -0.5 dB
<b>Phase between I/Os</b> .....	<1.28° at 3.58 MHz
<b>Differential phase error</b> .....	0.1%, 3.58 to 4.43 MHz
<b>Differential gain error</b> .....	0.1°, 3.58 to 4.43 MHz
<b>Max. propagation of delay</b> .....	5 ns typical (±1 ns)
<b>Crosstalk</b> .....	-80 dB @ 1 MHz, -62 dB @ 10 MHz, -52 dB @ 30 MHz
<b>Switching speed</b> .....	200 ns (max.)

## VIDEO INPUT – WIDEBAND / VIDEO BMES

<b>Number / Signal type</b> .....	Up to 128 (varies with configuration) RGBHV, RGBS, RGSB, RSGsBs,
<b>Wideband models</b> .....	component video, S-video, composite video
<b>Video models</b> .....	Up to 128 (usable quantity varies with configuration) component video, S-video, composite video
<b>Connectors</b> .....	128 BNC female (usable quantity varies with model)
<b>Nominal levels</b> .....	1 VP-p for Y of component video and S-video, and for composite video 0.7 VP-p for RGB and for R-Y and B-Y of component video 0.3 VP-p for C of S-video
<b>Minimum / Maximum levels</b> .....	Analogue: 0.5 V to 1.5 VP-p with no offset
<b>Impedance</b> .....	75 ohms
<b>Return loss</b> .....	<-30 dB @ 5 MHz

## VIDEO OUTPUT – WIDEBAND / VIDEO BMES

<b>Number / Signal type</b> .....	Up to 128 (varies with configuration) RGBHV, RGBS, RGSB, RSGsBs,
<b>Connectors</b> .....	128 BNC female (usable quantity varies with model)
<b>Nominal levels</b> .....	1 VP-p for Y of component video and S-video, and for composite video 0.7 VP-p for RGB and for R-Y and B-Y of component video 0.3 VP-p for C of S-video
<b>Maximum level</b> .....	2 VP-p
<b>Impedance</b> .....	75 ohms
<b>Return loss</b> .....	-25 dB to input section @ up to 50 MHz
<b>DC offset</b> .....	±10 mV typical with input at 0 offset
<b>Switching type</b> .....	Triple-Action™
<b>Slew rate</b> .....	>200 V/ms

## SYNC – SYNC BME

<b>Input and output types</b> .....	Software configurable for RGBHV or RGBS
<b>Sync connectors</b> .....	Up to 128 BNC female (usable quantity varies with configuration)
<b>Input level</b> .....	0.5 V to 5 VP-p (4 VP-p nominal)
<b>Output level</b> .....	5 VP-p
<b>Gain</b> .....	AGC to TTL: 4.0 V to 5.0 VP-p
<b>Input impedance</b> .....	Inputs 1 - 32: 510 ohms or 75 ohms, switchable Inputs 33 - 128: 510 ohms
<b>Output impedance</b> .....	75 ohms
<b>Horizontal frequency</b> .....	15 kHz to 150 kHz
<b>Vertical frequency</b> .....	30 Hz to 150 Hz
<b>Polarity</b> .....	Positive or negative (follows input)

## AUDIO – AUDIO BME

<b>Routing</b> .....	16 x 16 up to 128 x 128 mono or stereo matrix (in increments of 16), balanced/unbalanced
<b>Gain</b> (selectable per output) .....	Unbalanced output: 0dB (as shipped), or -6 dB (jumper-selectable) Balanced output: +6 dB (as shipped), or 0 dB (jumper-selectable)
<b>Frequency response</b> .....	20 Hz to 20 kHz, ±0.05 dB
<b>THD + Noise</b> .....	0.03% @ 20 Hz to 20 kHz, +15 dBu input, +21 dBu output
<b>S/N</b> .....	>85 dB, balanced, at rated maximum output
<b>Crosstalk</b> .....	<-70 dB @ 20 Hz to 20 kHz fully loaded
<b>Stereo channel separation</b> .....	>70 dB @ 20 Hz to 20 kHz
<b>CMRR</b> .....	>+75 dB, 20 Hz to 20 kHz

## AUDIO INPUT – AUDIO BME

<b>Number / Signal type</b> .....	16 to 128 (in increments of 16) mono or stereo, balanced/unbalanced
<b>Connectors</b> .....	(16 to 128) 3.5 mm captive screw connectors, 5 pole
<b>Impedance</b> .....	>10k ohms unbalanced/balanced, DC coupled
<b>Nominal level</b> .....	+4 dBu (1.23V), 0 dBu (0.775 V), -10 dBV (316 mV), -20 dBV (100 mV)
<b>Maximum level</b> .....	+21.5 dBu, (balanced or unbalanced) at 1%THD+N
<b>Input gain adjustment</b> .....	-24 dB to +9 dB, adjustable per input via RS-232 control or front panel

NOTE: 0 dBu = 0.775 Vrms, 0 dBV = 1 Vrms, 0 dBV = 2 dBu

## AUDIO OUTPUT – AUDIO BME

<b>Number / Signal type</b> .....	16 up to 128 (in increments of 16) mono or stereo, balanced/unbalanced
<b>Connectors</b> .....	(16 to 128) 3.5 mm captive screw connectors, 5 pole (quantity varies with configuration)
<b>Impedance</b> .....	50 ohms unbalanced, 100 ohms balanced
<b>Gain error</b> .....	±0.1 dB channel to channel
<b>Maximum level (Hi-Z)</b> .....	>+26.0 dBu, balanced at 1%THD+N
<b>Maximum level (600 ohm)</b> .....	>+24.0 dBm, balanced at 1%THD+N

## CONTROL / REMOTE – SWITCHER

<b>Serial control port</b> .....	RS-232 or RS-422, 9-pin female D connector
<b>Baud rate and protocol</b> .....	9600 baud, 8 data bits, 1 stop bit, no parity
<b>Serial control</b> .....	
<b>pin configurations</b> .....	2 = TX, 3 = RX, 5 = GND
<b>Ethernet control port</b> .....	1 RJ-45 female connector
<b>Ethernet data rate</b> .....	10/100Base-T, half/full duplex with autotdetect
<b>Ethernet protocol</b> .....	ARP, ICMP (ping), TCP/IP, Telnet, HTTP, SMTP
<b>System intercommunications</b> .....	2 RJ-45 connectors
<b>Remote keypad control</b> .....	(2) 5 mm, 5-pole captive screw connectors
<b>Program control</b> .....	Extron's control/configuration program for Windows® Extron's Simple Instruction Set (SIS™) Microsoft® Internet Explorer, Netscape® Navigator®, Telnet

## GENERAL

<b>Power*</b> .....	2 (positive-negative), 100 VAC to 240 VAC, 50/60 Hz; internal, universal Matrix 12000 wideband: 150 watts at 115 VAC, 60 Hz Matrix 12800 sync: 100 watts at 115 VAC, 60 Hz Matrix 12800 audio: 300 watts at 115 VAC, 60 Hz
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\* A redundant power supply is available.

<b>Temperature / Humidity</b> .....	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
<b>Rack mount</b> .....	Yes
<b>Enclosure type</b> .....	Metal
<b>Enclosure dimensions</b> .....	17.5" H x 17.0" W x 16.0" D (10U high, full rack width) 44.4 cm H x 43.2 cm W x 40.6 cm D (Depth excludes connectors. Width excludes rack ears.)

## Product weight

Matrix 12800 wideband .....	57.4 lbs (26.0 kg)
Matrix 12800 sync .....	54.0 lbs (24.5 kg)
Matrix 12800 audio .....	43.9 lbs (19.9 kg)

## Shipping weight

Matrix 12800 wideband .....	76.7 lbs (35 kg)
Matrix 12800 sync .....	73.3 lbs (34 kg)
Matrix 12800 audio .....	66 lbs (30 kg)

## DIM weight,

<b>international</b> (all models) .....	77 lbs (35 kg)
<b>Vibration</b> .....	ISTA 1A in carton (International Safe Transit Association)
<b>Listings</b> .....	UL, CUL
<b>Compliances</b> .....	CE, FCC Class A, VCCI, AS/NZS, ICES
<b>MTBF</b> .....	30,000 hours
<b>Warranty</b> .....	3 years parts and labor

NOTE: All nominal levels are at ±10%. Specifications are subject to change without notice.